

Customer No.: 31,561
Application No.: 10/709,038
Docket No.: 09005-US-PA

To the Claims

1. (original) A method of fabricating a polysilicon film, comprising:
providing a substrate;
forming an insulating layer, a first amorphous silicon layer and a cap layer over the substrate;
performing a first annealing to transform the first amorphous silicon layer into a first polysilicon layer with at least a hole;
removing the cap layer;
removing a portion of the insulating layer within the hole to form a first opening within the insulating layer, wherein the hole and the first opening constitute a second opening;
forming a second amorphous silicon layer over the first polysilicon layer and filling the second opening, wherein a recess is formed over a portion of the second amorphous silicon layer over the second opening; and
performing a second annealing and forming a second polysilicon layer by partially fusing the second amorphous silicon layer and the first polysilicon layer, and taking an unfused portion of the second amorphous silicon layer as seeds for crystallization.
2. (original) The method of fabricating a polysilicon film as recited in claim 1, wherein the cap layer comprises silicon dioxide.
3. (original) The method of fabricating a polysilicon film as recited in claim 1, wherein the step of performing the first annealing comprises performing an excimer laser annealing process.

Customer No.: 31,561
Application No.: 10/709,038
Docket No.: 09005-US-PA

4. (original) The method of fabricating a polysilicon film as recited in claim 1, wherein the step of removing the portion of the insulating layer within the hole comprises performing a wet etching using a solution containing hydrofluoric acid.

5. (original) The method of fabricating a polysilicon film as recited in claim 1, wherein the step of performing the second annealing comprises performing an excimer laser annealing process.

6. (original) The method of fabricating a polysilicon film as recited in claim 1, wherein a width of the second opening is smaller than one micron.

7-20. (cancelled)

21. (new) A method of fabricating a polysilicon film, comprising:
providing a structural substrate, wherein the structural substrate has a concave region;
forming an amorphous silicon layer over the structural substrate and filling the concave region; and

performing an annealing on the amorphous silicon layer for crystallization, so as to transform the amorphous silicon layer into a polysilicon layer, wherein the concave region induces a crystallization direction for the amorphous silicon layer.

22. (new) The method of claim 21, wherein in the step of providing the structural substrate, a hole is further formed in the structural substrate under the concave region.